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# BOTANICAL GAZETTE

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## Synopsis of North American Amaranthaceæ. III.

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FRÆLICHIA Moench. Meth. 1: 50. 1794.

Annual or perennial cinereous-pubescent herbs with opposite leaves and opposite or whorled spikes, flowers subtended by three scarious bracts (the laterals strongly imbricated), the densely woolly calyx tubular, cleft into five scarious lanceolate lobes, two of them becoming prominently winged or toothed below, the remaining three more or less tuberculate or smooth, all indurated in maturity and enclosing the thin indehiscent utricle, the filaments united into a tube bearing the five oblong anthers in the sinuses of the strap-shaped lobes, style capitate or lobed.

The original generic name *Frælichia* of Moench was restored by Moquin-Tandon in 1849, replacing *Oplotheca* Nutt. (*Hoplotheca* Spreng.), which, though not the only name since assigned to the group was most generally adopted at that time.

Moquin's primary sections HOPLOTHECA and DILOPHA, with stigmas capitate in the one case and penicillately lobed in the other, suggests a distinction so deep-seated as to seem at first more than specific in comparison with the very trivial distinctions of the species coordinated under these respective sections. Such an opinion is expressed in Bentham & Hooker Gen. Pl. 3: 41. But further study has shown that here, as is so often true of the older botanists, the breaking-up process has been carried too far. For example, Moquin presents five species under the section HOPLOTHECA, though the one set of characters alone which may with any degree of facility be laid hold of in this polymorphous group is, on the one hand, the unflinching presence of prominent, distinct, dorsal teeth on the

sepals of the fruiting calyx, designated by Holzinger as the *gracilis* group (Contr. Nat. Herb. 1: 213), and, on the other, a coalescence of the teeth in such a way as to form a broad wing, leaving only a serrate or crenulate margin to mark their origin. On this basis, then, we venture to act upon Holzinger's suggestion and reduce our five native forms of the section HOPLOTHECA to two species.

The section DILOPHA as we have seen it, though considerably divergent in its stigma character, is in most respects so intimately related to the HOPLOTHECA species as to preserve its specific relation to them. Since its habitat is restricted to tropical South America, we may limit its discussion in this paper to the suggestion that here, as in HOPLOTHECA, further study may likewise result ultimately in reduction of the number of species.

1. *F. FLORIDANA* (Nutt.) Moq. DC. Prodr. 13<sup>2</sup>: 420. 1849.

*Oplothea Floridana* Nutt. Gen. Am. 2: 79. 1818.

*O. gracilis* Hook. Ic. Pl. sub pl. 256. 1837-1854.

*F. gracilis* Moq. l. c.

*O. Texana* A. Br. Ann. Sci. Nat. III. 13: —. 1849.

Stem slender, leafless above, varying in height from a few centimeters to 9<sup>dm</sup>; leaves very variable in size, linear-lanceolate to ovate acute, mostly attenuate at base: bracts often becoming black in age: fruiting calyx ovate; dorsal crests dissected into distinct rigid irregular teeth.—From Georgia, Florida and the Gulf states throughout Texas, where it is most abundant, westward to Chihuahua, reaching its northern limits in Colorado, Nebraska, Wisconsin and Illinois. It does not appear to be found east of Illinois in the northern states.

While there is one unbroken transition series from certain minute specimens from southwestern Texas of Bigelow's collection, some of which are less than 3<sup>m</sup> high, to the leafier taller forms of the original *F. Floridana*, making it impossible to draw definite boundary lines at any point in this ascending scale, it yet appears that the proportion of intermediate forms is small, so that two groups, based almost solely on the size of the plant would seem to present themselves; though in our opinion this is not sufficiently justifiable ground for permitting them to remain separate. Mr. Holzinger arrives at a similar conclusion, but in preserving the name *gracilis* he has overlooked the priority of *Floridana*. See also Torrey in Pac. R. R. Rep. 4: 131, where the same conclu-

sion is reached. A specimen in the Gray herbarium, cultivated in 1848 from Texas seed, is peculiar in its glabrate habit, with very long narrow leaves, some of which are over 17<sup>cm</sup> long. It has not the appearance of *F. Floridana*, but its crest characters show very close affinities for this species, in view of which we have tentatively classified it here.

Type in Nat. herb. (?). The uncertainty here lies in the fact that the label on this specimen is not identical with Nuttall's familiar little square labels, and the words "garden specimen" are added, though "Banks of the Altamaha, Nuttall," would indicate that the specimen is of no slight importance.

#### F. FLORIDANA DRUMMONDII (Moq.).

*F. Drummondii* Moq. l. c. 421.

Plant taller and stouter, tawny-sericeous, with larger oblong-elliptical leaves: teeth of the sepal crests unequally united, in this regard passing into the next species.—Southwestern Texas and northern Mexico. Types in herb. Gray (*Berlandier*, 2001) and herb. Columbia College (*Drummond*, 326 ?). The latter was published in Torr. & Gray's Fl. N. Am. as *Oplotheca Floridana*. It is probable that it is one of Drummond's types, though Moquin makes no mention of the collection number.

#### 2. F. INTERRUPTA (L.) Moq. l. c. 421.

*Gomphrena interrupta* L. Sp. Pl. 2: 224. 1753.

*Celosia procumbens* Jacq. Misc. 2: 344. 1781.

*Gomphrena spicata* Lam. Encycl. 1: 120. 1791.

*Frælichia lanata* Moench Meth. 1: 50. 1794.

*Lophocarpus interrupta* Link Diss. Bot. Suerin. 52. 1795.

*Oplotheca interrupta* Nutt. Gen. Am. 1818.

*Ninanga interrupta* Raf. Fl. Tellur. 3: 76. 1836.

*Frælichia alata* Wats. Proc. Am. Acad. 21: 437. 1886.

Plant variable as in *F. Floridana* and not essentially distinct in habit from it: fruiting calyx ovate; teeth of the crest coalescent into a thin continuous broad wing which is usually erose-denticulate.—Arizona, Chihuahua, Sonora and Lower California, rare. Palmer and Pringle specimens in herbaria labelled *F. interrupta* prove to be *F. Floridana*. Type unknown.

If the absence of secondary crests which are invariably seen to appear on the mature fruiting calyx in the form of horny tubercles or nascent wings were to be accounted for on any grounds other than immaturity, it would be possible to recog-

nize Watson's *F. alata*. But we have been forced to abandon this as an unreliable character. Hence, it develops that the affinities of Watson's plant are here and not, as he supposed, with *F. tomentosa*.

F. INTERRUPTA **cordata**, var. nov.

*Frælichia Texana* Coult. & Fisher, Bot. Gaz. 17: 350. 1892.

Fruiting calyx fuscous, broad (broader than long), cordate, with broad crenate wings.—Western Texas. Types in herb. Coulter and J. D. Smith (Pena, *Nealley*, 421, referred to *F. Floridana* Moq. in Contr. Nat. Herb. 1: 48), and herb. Gray (*Wright*, 591, from western Texas). The name *Texana* is abandoned because of its preemption as a specific name under *Oplotheca* (see synonymy of *F. Floridana*).

GOSSYPIANTHUS Hook. Icon. 2: 251. 1840.

Procumbent and diffusely branching woolly herbs from a perennial root-stock, with thick, more or less silky-woolly leaves, the radical ones varying from linear-spatulate to obovate-spatulate or ovate-oblong, small axillary heads of perfect flowers, three delicate scarious bracts, five equal acute three-nerved very pilose sepals, five stamens united into a cup at base, short style and emarginate two-lobed stigma.

This genus is frequently confused with *Guilleminia*, which it closely resembles in aspect. It may be distinguished at a glance by the invariable presence of the rosette of radical leaves and the more conspicuously pilose flowers.

1. G. LANUGINOSUS (Poir.) Moq. DC. Prodr. 13<sup>2</sup>: 337. 1849.

*Paronychia lanuginosus* Poir. Encycl. Suppl. 4: 303. 1816?

*G. rigidiflorus* Hook. l. c. 1840.

*G. tenuiflorus* Hook. l. c. 1840.

Branching from the short thick root-stock: leaves generally pilose above and silky-canescens beneath, but often both surfaces becoming glabrate; the radical ones numerous in a flat rosette, varying in length from 2 to 7<sup>cm</sup>, persistent, sub-coriaceous; the cauline ones smaller (4 to 10<sup>mm</sup> long) spatulate-orbicular, obovate, ovate or lanceolate, opposite: bracts ovate-lanceolate: flowers densely covered with jointed hairs: sepals usually narrowly lanceolate, acuminate, with three prominent green nerves, scarious on the margin: filaments usually dilate: pistil equalling or surpassing the stamens.—Indian Territory, southward throughout central and western Texas, westward to Chihuahua, and reported as ex-

tending southward into Mexico (Hemsley Biol. Centr. Am.) and from the West Indies (Moq. l. c.). The only specimen in our possession found west of El Paso, Tex., was collected by Pringle near Chihuahua, Mex. While it may occur in the intervening regions, it is probably quite rare west of Texas. Type unknown.

G. LANUGINOSUS **Sheldoni**, n. var.

Plant more robust throughout: cauline leaves larger: flowers rigid, flat on the ventral side: bracts short orbicular: sepals destitute of chlorophyll, not scarious margined.—Collected in July, 1891, near Cash Creek, Indian Territory, by C. S. Sheldon (no. 170). Types in Nat. herb. and herb. Gray.

In merging *G. rigidiflorus* with *G. tenuiflorus* we have simply confirmed the suggestions of Dr. Watson (Proc. Am. Acad. 18: 144) and of Dr. Torrey (Bot. Bound. 180). Furthermore, there is no doubt that Moquin's *G. lanuginosus* must also be included here. Hooker f. in Benth. & Hook. Gen. Pl. 3: 37, 39 referred *Gossypianthus lanuginosus* Moq. to *Guilleminia*, briefly characterizing it by the narrower lobes of its perianth. Even if the transfer were correct, this difference would scarcely be counted of specific importance in a group of so keen susceptibility to variation as is everywhere prevalent in the *Amaranthaceæ*. But a critical study of Moquin's description of *Gossypianthus lanuginosus* discloses the fact that it is quite distinct from *Guilleminia densa* Moq. in the presence of a rosette of radical leaves and of distinctly 3-nerved acute sepals, both of which are characteristic of *Gossypianthus*. It is not probable, moreover, that so critical an observer as Moquin-Tandon should have committed the error of confusing two genera so distinct in floral character. Still more conclusive is the fact that no *Guilleminia* with 3-nerved sepals has been found in any of our larger herbaria, though definite statements are made about its range in Coulter's Botany of Western Texas, and in Hemsley's Biol. Centr. Am. Since the name *Gossypianthus lanuginosus* does not appear in our herbaria, the only reasonable explanation is that the facts of range were taken from the original *Paronychia lanuginosa*. *Guilleminia lanuginosa* Hook. f., then, so far as it pertains to our own boundary region is fictitious; and the plants in question that have been referred to under the name must be looked for in the herbaria among the material labelled *Gossypianthus rigidiflorus* and *G. tenuiflorus*.

Specific lines had been drawn chiefly on relative length of bracts, relative length of stamens to the pistil, and on slight differences in the shape of the filaments. The first two prove to be dependent upon age of specimen, while the last point seems in most cases to be wholly without foundation.

**GUILLEMINIA** HBK. Nov. Gen. et Sp. **6**: 40. *pl.* 518.  
1823, non Neck. Elem. **2**: 132. 1790.

Habit very similar to *Gossypianthus* with opposite cauline leaves connate at base, the radical ones few, long spatulate, not persistent, dense leafy axillary flower clusters, minute scarious woolly flowers, three oblong delicate bracts, campanulate 5-lobed calyx with obconic tube, five stamens inserted at the mouth of the tube opposite the calyx lobes, short style with emarginately 2-lobed stigma and translucent seed.

The presence of radical leaves in mature specimens is very rare, having been observed only once among fifty specimens. They differ from those of *Gossypianthus* in their delicate texture, and so withering and disappearing before the flowering period.

Necker's *Guilleminia* is a synonym of *Votomita* Aubl. (1775), an ill-defined genus of the *Cornaceæ*. The present acceptance of the law of synonyms would suggest that the name might be justifiably abandoned; and this course would now be taken if the retroactive force of this law were not still an open question. But in view of its continued agitation and the probable final rejection of the "retroactive" principle, we have adopted the more conservative plan of retaining the present name.

**1.** *G. DENSA* (Willd.) Moq. DC. Prodr. **13**<sup>2</sup>: 338. 1849.

*Illecebrum densum* Willd. Roem et Schult. Syst. **5**: 517. 1819.

*G. illecebroides* HBK. l. c. 1823.

*G. densa alsinefolia* Moq. l. c. 1849.

*Achyranthes piloselloides* Poit. ex Moq. l. c.

Leaves spatulate to ovate or lanceolate, minute, punctate, mostly bright green and glabrous above, pilose-pubescent below: bracts sub-equal: calyx lobes oblong, obtuse, 1-nerved. —Western Texas, Southern Arizona and New Mexico, extending southward into tropical America. It has been found as far south as Bolivia. Type unknown.

G. DENSA **aggregata**, n. var.

Plant larger with flowers and leaves densely aggregated on the long stout branches. Southern Mexico.

Types: Near Mexico, "Bustamenta y Rocha," in herb. Columbia College; Jalisco, Guadalajara, (*Palmer* 47 in 1886) in herb. J. D. Smith, Columbia College and Nat. herb.

CLADOTHRIX Nutt. ex Moq. DC. Prodr. 13<sup>2</sup>: 359. 1849.

Low herbaceous annuals or suffruticose perennials with opposite small (often very minute) rounded or oblong leaves, which, together with the branches, are more or less encased in a felt-like tomentum of verticillately branched hairs, slightly or deeply imbedding the small scattered axillary perfect flowers, three concave hyaline bracts, five equal, oblong sepals, filaments coalescent at base into a short cup with small staminodia present (or none), large oblong 1-celled anthers and deeply 2-cleft subsessile stigma.

The genus presents very close affinities with *Alternanthera*, section "*simple staminodia*," but when it is considered that the prevailing and typical representatives of the genus are mostly destitute of staminodia, that these staminodia when present are relatively much smaller than those of *Alternanthera*, and that the general plant habit with its stellate tomentum has no equivalent in that section of *Alternanthera*, (*A. stellata* (Wats.) having laciniate staminodia), it at once becomes apparent that the genus *Cladothrix* stands on safe ground apart from *Alternanthera*.

\* *Herbaceous, annual, mostly prostrate.*

I. C. LANUGINOSA Nutt. ex Moq. l. c. 1849.

*Achyranthes lanuginosa* Nutt. Trans. Amer. Phil. Soc. N. S. 5: 166. 1820.

*Alternanthera lanuginosa* Torr. in Emory's Rep. 150. 1848. Moq. in DC. Prodr. 13<sup>2</sup>: 359. 1849.

Very various as to habit and foliage, mostly prostrate, but sometimes ascending, densely or sparingly tomentose (becoming glabrate): branches loosely spreading (or often densely diffuse): leaves round, tapering into a petiole, or minute elliptical when crowded: flowers mostly exposed with the scarious yellow sepals longer than in the other species: stamens either very unequal with no staminodia or equal with very short obtuse lobes between the filaments.—The most widely distributed species of *Cladothrix*, apparently abundant from



Kansas and Arkansas through Texas to Arizona and throughout northern Mexico. Type in herb. Columbia College.

*\*\*Mostly suffruticose, perennial, ascending or erect.*

+ *Staminodia (alternating lobes) very short and broad, sometimes slightly emarginate.*

2. *C. SUFFRUTICOSA* (Torr.) Wats. Bot. Calif. **2**: 43. 1880.

*Alternanthera suffruticosa* Torr. Bot. Bound. 181. 1859.

This species has a thick shrubby base and specimens show branches of the preceding year among the flowering shoots.—Reported only from western Texas (*Wright* 1757 and 592; *Harvard* 110 in 1883). Wright's specimens are in herb. Gray, Columbia College and Nat. herb.

+ + *Staminodia longer, acute (nearly one-half the length of the filament).*

3. *C. OBLONGIFOLIA* Wats. Proc. Amer. Acad. **17**: 376. 1882.

*C. cryptantha* Wats. l. c. **26**: 125. 1891.

Stems procumbent, often 6<sup>dm</sup> long, suffruticose or shrubby ("sometimes showing several years' growth at the base," Coville: Bot. Death Valley 179), the whole plant covered with a very dense persistent white stellate pubescence: branches short, ascending or erect, much crowded: leaves ovate-oblong or oblanceolate to round spatulate, or sometimes minute, elliptical, densely aggregated: flowers in small axillary clusters, deeply imbedded in tomentum, the reduced upper leaves of the flowering branches often forming a sort of involucre: sepals hyaline, white: staminodia present in the form of acute lobes between the filaments, and scarcely less than half their length.—Confined to south-eastern Arizona and the adjoining regions of California. Types of the Newberry collection in herb. Gray, and Nat. herb.; of Pringle in herb. Gray, Coulter, J. D. Smith, and Nat. herb.; of Parish brothers in the same herbaria.

It will be noticed that the forms merged under this species fall together very naturally by virtue of their limited range, suffruticose habit and somewhat prominent intermediate lobes of the stamineal tube (staminodia), though *C. oblongifolia* thereby loses its character of exclusively oblong leaves.

*Herbarium Lake Forest University.*